

CLAIMS

What is claimed is:

1. A composite sheet capable of reflecting radiant energy, said sheet comprising:
 - a reflective layer having a reflective surface and an opposite surface;
 - a netting layer overlying said opposite surface of said reflective layer, said netting layer comprising a plurality of first elongated members positioned in spaced apart relation to one another and a plurality of second elongated members oriented angularly to said first elongated members and positioned in spaced apart relation to one another, said first and second elongated members defining a plurality of interstices in said netting layer, said netting layer being biasable in at least one direction; and
 - a damping layer overlying said netting layer.
2. A composite sheet according to Claim 1, wherein said reflective layer comprises:
 - a flexible resilient first layer having first and second surfaces oppositely disposed;
 - a metalized film layer overlying said first surface of said first layer; and
 - a metal foil layer overlying said metalized film layer, said metal foil layer comprising said reflective surface, said second surface comprising said opposite surface of said reflective layer.
3. A composite sheet according to Claim 1, further comprising an adhesive layer positioned between

said netting layer and one of said reflective layer and said damping layer, said adhesive layer extending through said interstices and bonding said damping layer and said netting layer to said opposite surface of said reflective layer.

4. A composite sheet according to Claim 3, wherein said adhesive layer is positioned between said netting layer and said reflective layer.

5. A composite sheet according to Claim 2, wherein said first layer comprises a polymer.

6. A composite sheet according to Claim 2, wherein said first layer is comprised of polyethylene terephthalate.

7. A composite sheet according to Claim 2, wherein said metal foil layer comprises aluminum.

8. A composite sheet according to Claim 7, wherein said metal foil layer is between about 0.0003 to about 0.002 inches thick.

9. A composite sheet according to Claim 7, wherein said metalized film layer comprises aluminum.

10. A composite sheet according to Claim 9, wherein said metalized film layer is between about 10 to about 200 angstroms thick.

11. A composite sheet according to Claim 2, wherein said metal foil layer is adhesively adhered to said metalized film layer.

12. A composite sheet according to Claim 1, wherein said first and second elongated members are oriented at right angles to one another.

13. A composite sheet according to Claim 1, wherein said first elongated members have a greater bending stiffness than said second elongated members.

14. A composite sheet according to Claim 1, wherein said netting layer is comprised of a thermoplastic polymer.

15. A composite sheet according to Claim 1, wherein said netting layer is comprised of polypropylene.

16. A composite sheet according to Claim 1, wherein said netting layer is comprised of a material selected from the group consisting of polyester, polypropylene, polyethylene and nylon.

17. A composite sheet according to Claim 3, wherein said adhesive layer comprises a pressure sensitive adhesive.

18. A composite sheet according to Claim 17, wherein said adhesive layer is between about 0.0005 and about 0.0035 inches thick.

19. A composite sheet according to Claim 1, wherein said damping layer comprises a non-woven material.

20. A composite sheet according to Claim 1, wherein said damping layer comprises polyester felt.

21. A composite sheet according to Claim 20, wherein said polyester felt is between about 0.03 and about 0.1 inches thick.

22. A composite sheet according to Claim 13, wherein said sheet is resiliently biased into a tube defining a central space.

23. A composite sheet according to Claim 22, wherein said reflective surface comprises an outwardly facing surface of said tube.

24. A composite sheet according to Claim 22, wherein said first elongated members are oriented substantially perpendicular to an axis extending lengthwise along said tube.

25. A composite sheet capable of reflecting radiant energy, said sheet comprising:

a reflective layer having a reflective surface and an opposite surface;

a netting layer overlying said opposite surface of said reflective layer, said netting layer comprising a plurality of first elongated members positioned in spaced apart relation to one another and a plurality of second elongated members oriented angularly to said first elongated members and positioned in spaced apart relation to one another, said first and second elongated members defining a plurality of interstices in said netting layer;

a damping layer overlying said netting layer;
and

an adhesive layer positioned between said netting layer and one of said opposite surface of said reflective layer and said damping layer, said adhesive layer extending through said interstices and bonding said damping layer and said netting layer to said opposite surface of said reflective layer.

26. A composite sheet according to Claim 25, wherein said adhesive layer is positioned between said netting layer and said opposite surface of said reflective layer.

27. A composite sheet according to Claim 25, wherein said reflective layer comprises:

a flexible resilient first layer having first and second surfaces oppositely disposed;

a metalized film layer overlying said first surface of said first layer; and

a metal foil layer overlying said metalized film layer, said metal foil layer comprising said reflective surface, said second surface comprising said opposite surface of said reflective layer.

28. A composite sheet according to Claim 27, wherein said first layer is comprised of polyethylene terephthalate.

29. A composite sheet according to Claim 27, wherein said metal foil layer comprises aluminum.

30. A composite sheet according to Claim 29, wherein said metalized film layer comprises aluminum.

31. A composite sleeve for receiving elongated items, said sleeve comprising:

a sidewall surrounding and defining a central space for receiving said elongated items, said sidewall having a reflective surface and an opposite surface;

a netting layer overlying said opposite surface of said sidewall, said netting layer comprising a plurality of first elongated members positioned in spaced apart relation to one another and a plurality of second elongated members oriented angularly to said first elongated members and positioned in spaced apart relation to one another, said first and second elongated members defining a plurality of interstices in said netting layer, said netting layer being biasable in at least one direction; and

a damping layer overlying said netting layer.

32. A composite sleeve according to Claim 31, wherein said sidewall comprises:

a flexible resilient first layer having first and second surfaces oppositely disposed;

a metalized film layer overlying said first surface of said first layer; and

a metal foil layer overlying said metalized film layer, said metal foil layer comprising said reflective surface, said second surface comprising said opposite surface of said sidewall.

33. A composite sleeve according to Claim 31, further comprising an adhesive layer positioned between said netting layer and one of said opposite surface of said sidewall and said damping layer, said adhesive layer extending through said interstices and bonding

said damping layer and said netting layer to said opposite surface of said sidewall.

34. A composite sleeve according to Claim 33, wherein said adhesive layer is positioned between said netting layer and said opposite surface of said sidewall.

35. A composite sleeve according to Claim 31, wherein said reflective surface faces outwardly away from said central space.

36. A composite sleeve according to Claim 31, wherein said sidewall comprises first and second edges oriented substantially lengthwise along said sleeve, said edges defining an opening providing access to said central space.

37. A composite sleeve according to Claim 36, wherein said sidewall is resiliently biased so that the first edge overlies the second edge.

38. A composite sleeve according to Claim 36, further comprising a means for closing said opening mounted on said sidewall along at least one of said edges.

39. A composite sleeve according to Claim 32, wherein said first layer is comprised of a polymer.

40. A composite sleeve according to Claim 32, wherein said first layer is comprised of polyethylene terephthalate.

41. A composite sleeve according to Claim 32, wherein said metal foil layer comprises aluminum.

42. A composite sleeve according to Claim 41, wherein said metal foil layer is between about 0.0003 to about 0.002 inches thick.

43. A composite sleeve according to Claim 41, wherein said metalized film layer comprises aluminum.

44. A composite sleeve according to Claim 43, wherein said metalized film layer is between about 0.0005 to about 0.001 inches thick.

45. A composite sleeve according to Claim 31, wherein said first and second elongated members are oriented at right angles to one another.

46. A composite sleeve according to Claim 31, wherein said first elongated members have a larger bending stiffness than said second elongated members.

47. A composite sleeve according to Claim 46, wherein said first elongated members are oriented substantially perpendicular to an axis extending lengthwise along said sleeve.

48. A composite sleeve according to Claim 31, wherein said netting layer is comprised of a thermoplastic polymer.

49. A composite sleeve according to Claim 48, wherein said netting layer is comprised of polypropylene.

50. A composite sleeve according to Claim 31, wherein said netting layer is comprised of a material selected from the group consisting of polyester, polypropylene, polyethylene and nylon.

51. A composite sleeve according to Claim 33, wherein said adhesive layer comprises a pressure sensitive adhesive.

52. A composite sleeve according to Claim 51, wherein said adhesive layer is between about 0.0005 and about 0.0035 inches thick.

53. A composite sleeve according to Claim 31, wherein said damping layer comprises a non-woven material.

54. A composite sleeve according to Claim 31, wherein said damping layer comprises polyester felt.

55. A composite sleeve according to Claim 53, wherein said non-woven layer is between about 0.03 and about 0.1 inches thick.

56. A composite sleeve for receiving elongated items, said sleeve comprising:
 a sidewall surrounding and defining a central space for receiving said elongated items, said sidewall having a reflective surface and an opposite surface;
 a netting layer juxtaposed with said opposite surface of said sidewall, said netting layer comprising a plurality of first elongated members positioned in spaced apart relation to one another and a plurality of second elongated members oriented angularly to said

first elongated members and positioned in spaced apart relation to one another, said first and second elongated members defining a plurality of interstices in said netting layer;

a damping layer overlying said netting layer;
and

an adhesive applied so as to penetrate said interstices and bond said damping layer and said netting layer to said opposite surface of said sidewall.

57. A composite sleeve according to Claim 56, wherein said adhesive is positioned between said netting layer and said opposite surface of said sidewall.

58. A composite sleeve according to Claim 56, wherein said sidewall comprises:

a flexible resilient first layer having first and second surfaces oppositely disposed;

a metalized film layer overlying said first surface of said first layer; and

a metal foil layer overlying said metalized film layer, said metal foil layer comprising said reflective surface, said second surface comprising said opposite surface of said sidewall.

59. A composite sleeve according to Claim 58, wherein said first layer is comprised of polyethylene terephthalate.

60. A composite sleeve according to Claim 58, wherein said metal foil layer comprises aluminum.

61. A composite sleeve according to Claim 60, wherein said metalized film layer comprises aluminum.

62. A composite sheet capable of reflecting radiant energy, said sheet comprising:

a flexible resilient first layer having first and second surfaces oppositely disposed;

a metalized film layer overlying said first surface of said first layer;

a metal foil layer overlying said metalized film layer; and

a netting layer overlying said second surface of said first layer, said netting layer comprising a plurality of first elongated members positioned in spaced apart relation to one another and a plurality of second elongated members oriented angularly to said first elongated members and positioned in spaced apart relation to one another, said first and second elongated members defining a plurality of interstices in said netting layer, said netting layer being biasable in at least one direction.

63. A composite sheet according to Claim 62, further comprising a flexible damping layer overlying said netting layer.

64. A composite sheet according to Claim 63, further comprising an adhesive layer positioned between said netting layer and said second surface of said first layer, said adhesive layer extending through said interstices and bonding said damping layer and said netting layer to said second surface of said first layer.

65. A composite sheet capable of reflecting radiant energy, said sheet comprising:

- a flexible resilient first layer having first and second surfaces oppositely disposed;

- a metalized film layer overlying said first surface of said first layer;

- a metal foil layer overlying said second surface of said first layer; and

- a netting layer overlying said metal foil layer, said netting layer comprising a plurality of first elongated members positioned in spaced apart relation to one another and a plurality of second elongated members oriented angularly to said first elongated members and positioned in spaced apart relation to one another, said first and second elongated members defining a plurality of interstices in said netting layer, said netting layer being biasable in at least one direction.

66. A composite sheet according to Claim 65, further comprising a damping layer overlying said netting layer.

67. A composite sheet according to Claim 66, further comprising an adhesive layer positioned between said netting layer and said metal foil layer, said adhesive layer extending through said interstices and bonding said damping layer and said netting layer to said metal foil layer.